The \texttt{tipauni} package

Niranjan$^*$

Version 0.1 — 2021/04/27

\url{https://ctan.org/pkg/tipauni}
\url{https://gitlab.com/niruvt/tipauni}

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Abstract

This package is the second step for \LaTeX-internally bridging the gap between the Unicode and the TIPA package. The first step was the package \texttt{unitipa}. Users can now use their beloved TIPA shortcuts with the benefits of Unicode i.e. searchability, copy-pasting, changing the font and many more. As this package needs the package \texttt{fontspec} for loading an IPA font, it needs to be compiled with X\LaTeX or Lua\LaTeX. This package can also be viewed as an ASCII-based input method for producing IPA characters in Unicode.

1 Acknowledgements

This package is completed because of the rigorous help by Jairo A. del Rio, Jonathan P. Spratte & Ulrike Fischer. Their suggestions and contributions are extremely valuable for the development of this package.

2 Package options

documentfont \texttt{documentfont=(font name)}

The default font for the entire document set by this package is the Charis SIL. Users can easily change it with the package-option \texttt{documentfont}. This option takes one value which is the \texttt{(font name)}. e.g. For using the Doulos SIL font as the main font, use the package like it is used in the following.

\texttt{\usepackage[documentfont=DoulosSIL]{tipauni}}

incompatible

By default tipauni will throw a warning if symbols not contained in the tipa package were used. Using this option you can switch this check off if you don’t have to stay compatible with tipa to silence this warning.

3 List of available commands

TIPA has two alternative methods for inputting IPA characters. In the following tables, \textbf{Input A} column lists all the long TIPA commands (e.g. \texttt{\textt rat} \& \textbf{Input B} column lists the short ones (e.g. \texttt{\textipa{\textipa}}\texttt{\textipa}). This documentation lists down all the commands necessary for typing symbols in the IPA chart.

3.1 Pulmonic consonants

<table>
<thead>
<tr>
<th>Description</th>
<th>- Input A</th>
<th>- Input B</th>
<th>- Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Retroflex voiceless stop</td>
<td>\texttt{\textscript{\textipa{\textipa}}}</td>
<td>\texttt{\textipa{\textipa}}</td>
<td>\texttt{[t]}</td>
</tr>
<tr>
<td>Retroflex voiced stop</td>
<td>\texttt{\textscript{\textipa{\textipa}}}</td>
<td>\texttt{\textipa{\textipa}}</td>
<td>\texttt{[d]}</td>
</tr>
</tbody>
</table>

\footnote{All of these commands must be enclosed in the \texttt{\textipa} command. (e.g. \texttt{\textipa{\textipa}} \texttt{\textipa} for \texttt{[t]})}
<table>
<thead>
<tr>
<th>Consonant Type</th>
<th>Command 1</th>
<th>Command 2</th>
<th>Command 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Palatal voiced stop</td>
<td><code>\textbardotlessj</code></td>
<td><code>-j</code></td>
<td><code>[j]</code></td>
</tr>
<tr>
<td>Uvular voiced stop</td>
<td><code>\textscg</code></td>
<td><code>-G</code></td>
<td><code>[g]</code></td>
</tr>
<tr>
<td>Glottal voiceless stop</td>
<td><code>\textglotstop</code></td>
<td><code>-P</code></td>
<td><code>[ʔ]</code></td>
</tr>
<tr>
<td>Labiodental nasal</td>
<td><code>\textltailm</code></td>
<td><code>-M</code></td>
<td><code>[ɱ]</code></td>
</tr>
<tr>
<td>Retroflex nasal</td>
<td><code>\textrtailn</code></td>
<td><code>-n</code></td>
<td><code>[ɳ]</code></td>
</tr>
<tr>
<td>Palatal nasal</td>
<td><code>\textltailn</code></td>
<td><code>-m</code></td>
<td><code>[ɲ]</code></td>
</tr>
<tr>
<td>Velar nasal</td>
<td><code>\textng</code></td>
<td><code>-N</code></td>
<td><code>[ŋ]</code></td>
</tr>
<tr>
<td>Uvular nasal</td>
<td><code>\textscn</code></td>
<td><code>-N</code></td>
<td><code>[ɴ]</code></td>
</tr>
<tr>
<td>Labiodental flap(^1)</td>
<td><code>\labdentflap</code></td>
<td><code>-v</code></td>
<td><code>[v]</code></td>
</tr>
<tr>
<td>Alveolar tap</td>
<td><code>\textfishhookr</code></td>
<td><code>-r</code></td>
<td><code>[ɾ]</code></td>
</tr>
<tr>
<td>Retroflex flap</td>
<td><code>\textrtailr</code></td>
<td><code>-r</code></td>
<td><code>[ɽ]</code></td>
</tr>
<tr>
<td>Bilabial voiceless fricative</td>
<td><code>\textphi</code></td>
<td><code>-φ</code></td>
<td><code>[ɸ]</code></td>
</tr>
<tr>
<td>Bilabial voiced fricative</td>
<td><code>\textbeta</code></td>
<td><code>-β</code></td>
<td><code>[β]</code></td>
</tr>
<tr>
<td>Dental voiceless fricative</td>
<td><code>\texttheta</code></td>
<td><code>-θ</code></td>
<td><code>[θ]</code></td>
</tr>
<tr>
<td>Dental voiced fricative</td>
<td><code>\textsh</code></td>
<td><code>-ʃ</code></td>
<td><code>[ʃ]</code></td>
</tr>
<tr>
<td>Uvular voiced fricative</td>
<td><code>\textyogh</code></td>
<td><code>-ʒ</code></td>
<td><code>[ʒ]</code></td>
</tr>
<tr>
<td>Pharyngeal voiceless fricative</td>
<td><code>\textch</code></td>
<td><code>-χ</code></td>
<td><code>[χ]</code></td>
</tr>
<tr>
<td>Pharyngeal voiced fricative</td>
<td><code>\textrevglotstop</code></td>
<td><code>-ʕ</code></td>
<td><code>[ʕ]</code></td>
</tr>
<tr>
<td>Glottal voiced fricative</td>
<td><code>\textth</code></td>
<td><code>-ɦ</code></td>
<td><code>[ɦ]</code></td>
</tr>
<tr>
<td>Alveolar voiceless lateral fricative</td>
<td><code>\textbeltl</code></td>
<td><code>-l</code></td>
<td><code>[ɬ]</code></td>
</tr>
<tr>
<td>Alveolar voiced lateral fricative</td>
<td><code>\textlyoghlig</code></td>
<td><code>-ẓ</code></td>
<td><code>[ɭ]</code></td>
</tr>
<tr>
<td>Labiodental lateral fricative</td>
<td><code>\labdentapp</code></td>
<td><code>-v</code></td>
<td><code>[v]</code></td>
</tr>
<tr>
<td>Alveolar approximant</td>
<td><code>\textturnr</code></td>
<td><code>-ɾ</code></td>
<td><code>[ɾ]</code></td>
</tr>
<tr>
<td>Retroflex approximant</td>
<td><code>\textturnrrtail</code></td>
<td><code>-r</code></td>
<td><code>[ɹ]</code></td>
</tr>
<tr>
<td>Velar approximant</td>
<td><code>\textturnmrleg</code></td>
<td><code>-m</code></td>
<td><code>[ɰ]</code></td>
</tr>
<tr>
<td>Retroflex lateral approximant</td>
<td><code>\textrtaill</code></td>
<td><code>-l</code></td>
<td><code>[ɭ]</code></td>
</tr>
<tr>
<td>Palatal lateral approximant</td>
<td><code>\texttaill</code></td>
<td><code>-l</code></td>
<td><code>[ɭ]</code></td>
</tr>
<tr>
<td>Velar lateral approximant</td>
<td><code>\textsl</code></td>
<td><code>-l</code></td>
<td><code>[ɭ]</code></td>
</tr>
</tbody>
</table>

\(^1\) These commands are also available without package tipa.
\(^2\) A symbol for this sound was introduced in 2005. The last update of the package tipa was in 2004, so this character is missing in it. A command for it is provided by this package. Such tipauni-exclusive commands are written with red color in this documentation.

### 3.2 Non-Pulmonic consonants
### 3.3 Other symbols

<table>
<thead>
<tr>
<th>Description</th>
<th>Input A</th>
<th>Input B</th>
<th>Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Labial-velar voiceless fricative</td>
<td>- \textturnw</td>
<td>- *w</td>
<td>[ʍ]</td>
</tr>
<tr>
<td>Labial-palatal voiced approximant</td>
<td>- \textturnh</td>
<td>- 4</td>
<td>[ɥ]</td>
</tr>
<tr>
<td>Epiglottal voiceless fricative</td>
<td>- \textsch</td>
<td>- ;H</td>
<td>[ʜ]</td>
</tr>
<tr>
<td>Epiglottal voiced fricative/approximant</td>
<td>- \textbarrevglotstop</td>
<td>- *1</td>
<td>[ʢ]</td>
</tr>
<tr>
<td>Alveolar voiced lateral flap</td>
<td>- \textturnlonglegr</td>
<td>- !r</td>
<td>[ɺ]</td>
</tr>
<tr>
<td>Epiglottal plosive</td>
<td>- \textbarglotstop</td>
<td>- *2</td>
<td>[ʡ]</td>
</tr>
<tr>
<td>Alveolo-palatal voiceless fricative</td>
<td>- \textctc</td>
<td>- C</td>
<td>[ɕ]</td>
</tr>
<tr>
<td>Alveolo-palatal voiced fricative</td>
<td>- \textctz</td>
<td>- *2</td>
<td>[ʑ]</td>
</tr>
<tr>
<td>Postalveolar-velar voiceless fricative</td>
<td>- \textthcheng</td>
<td>- *3</td>
<td>[ʂ]</td>
</tr>
</tbody>
</table>

### 3.4 Vowels

<table>
<thead>
<tr>
<th>Description</th>
<th>Input A</th>
<th>Input B</th>
<th>Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Near-close near-front unrounded</td>
<td>- \textsci</td>
<td>- I</td>
<td>[ɨ]</td>
</tr>
<tr>
<td>Near-close near-front rounded</td>
<td>- \textscy</td>
<td>- y</td>
<td>[ʉ]</td>
</tr>
<tr>
<td>Open-mid front unrounded</td>
<td>- \textepsi</td>
<td>- E</td>
<td>[ɘ]</td>
</tr>
<tr>
<td>Close central unrounded</td>
<td>- \textbari</td>
<td>- 1</td>
<td>[ɚ]</td>
</tr>
<tr>
<td>Close central rounded</td>
<td>- \textbaru</td>
<td>- 0</td>
<td>[ʊ]</td>
</tr>
<tr>
<td>Near-close near-back rounded</td>
<td>- \textupsilon</td>
<td>- U</td>
<td>[ɐ]</td>
</tr>
<tr>
<td>Close-mid central unrounded</td>
<td>- \textreve</td>
<td>- 9</td>
<td>[ɔ]</td>
</tr>
<tr>
<td>Close-mid central rounded</td>
<td>- \textbaro</td>
<td>- 8</td>
<td>[o]</td>
</tr>
<tr>
<td>Mid central vowel</td>
<td>- \textschwa</td>
<td>- Ø</td>
<td>[ɔ]</td>
</tr>
<tr>
<td>Open-mid central unrounded</td>
<td>- \textrevesilon</td>
<td>- 3</td>
<td>[ɔ]</td>
</tr>
<tr>
<td>Open-mid central rounded</td>
<td>- \textcloserevesilon</td>
<td>- k</td>
<td>[ʊ]</td>
</tr>
<tr>
<td>Near-open central</td>
<td>- \textturna</td>
<td>- 5</td>
<td>[ʊ]</td>
</tr>
<tr>
<td>Close back unrounded</td>
<td>- \textturnm</td>
<td>- W</td>
<td>[ɯ]</td>
</tr>
<tr>
<td>Close-mid back unrounded</td>
<td>- \textmshorns</td>
<td>- 7</td>
<td>[v]</td>
</tr>
</tbody>
</table>
Open-mid back unrounded - \textturnv - 2 - [ʌ]
Open-mid back rounded - \textopeno - 0 - [ɔ]
Open back unrounded - \textscripta - A - [ɑ]
Open back rounded - \textturnscripta - 6 - [ɔ]

<table>
<thead>
<tr>
<th>3.5 Independent diacritics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
</tr>
<tr>
<td>Rhoticity</td>
</tr>
<tr>
<td>No audible release</td>
</tr>
<tr>
<td>Tie bar (standalone)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>3.6 Dependent diacritics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
</tr>
<tr>
<td>Voiceless</td>
</tr>
<tr>
<td>Voiced</td>
</tr>
<tr>
<td>More rounded</td>
</tr>
<tr>
<td>Less rounded</td>
</tr>
<tr>
<td>Advanced</td>
</tr>
<tr>
<td>Retracted</td>
</tr>
<tr>
<td>Mid-centralized</td>
</tr>
<tr>
<td>Syllabic</td>
</tr>
<tr>
<td>Non-syllabic</td>
</tr>
<tr>
<td>Breathy voiced</td>
</tr>
<tr>
<td>Creaky voiced</td>
</tr>
<tr>
<td>Linguolabial</td>
</tr>
<tr>
<td>Velarized</td>
</tr>
<tr>
<td>Raised</td>
</tr>
<tr>
<td>Lowered</td>
</tr>
<tr>
<td>Advanced tongue root</td>
</tr>
<tr>
<td>Retracted tongue root</td>
</tr>
<tr>
<td>Dental</td>
</tr>
<tr>
<td>Apical</td>
</tr>
<tr>
<td>Laminal</td>
</tr>
<tr>
<td>Tie bar (top)</td>
</tr>
<tr>
<td>Tie bar (bottom)</td>
</tr>
</tbody>
</table>

1 The documentation of package the tipa on p. 53 describes a shorthand command i.e. \(1\langle\text{arg}\) which is not functional. I haven’t investigated the reasons, but instead provided a new shorthand command for this character.
4 Implementation

(*@=tipauni\*)

Provide the package with some description \& version specifications.

\ProvidesPackage{tipauni}[2021/04/27 v0.1
\ Unicode characters with TIPA commands]

Load necessary packages.

\RequirePackage{sparse}
\RequirePackage{fontspec}
\RequirePackage{environ}
\RequirePackage{xkeyval}
\RequirePackage{ifthen}

Package options are provided using the package xkeyval. The following commands provide the option documentfont.

\setmainfont{CharisSIL} \%% https://ctan.org/pkg/charissil
\DeclareOptionX{documentfont}{\setmainfont{#1}}
\newif\ifnontipaignore
\DeclareOptionX{incompatible}{\nontipaignoretrue}
\ProcessOptionsX\relax

The following commands were kindly suggested by Phelype Oleinik for developing a conditional which is always global.

\newif\ifnontipa
\protected\def\nontipatrue{\global\let\ifnontipa\iftrue}
\protected\def\nontipafalse{\global\let\ifnontipa\iffalse}
\ifnontipaignore
\protected\def\nontipatrue{}\fi

The following commands provide the command \texttt{\textbackslash tipaunicmd} for printing characters that are missing in the \texttt{tipa} package.

\NewDocumentCommand\tipaunicmd{ m m }{\NewDocumentCommand#1{ }{\nontipatrue #2}}

As can be seen above, everytime when a command that is absent in the \texttt{tipa} package is provided, it sets the conditional \texttt{nontipa} to true value. At the end of the document this package checks if there is any instance of a non-TIPA command. If yes, it generates a warning in the .log file saying that this code is now incompatible with the TIPA package and some characters might be displayed with a different font. All of this is achieved with the help of following commands. The discussion on this question helped a lot for fine tuning the warning message.

\AtEndDocument{%
\ifnontipa
\PackageWarningNoLine{tipauni}{% You have used a command(s) that is (are) not in \texttt{tipsa}

\MessageBreak supported by package TIPA. Thus your current code is \texttt{incompatible} with that package. These commands are \texttt{printed} with a different Unicode font. Refer to the \texttt{documentation of package tipauni} for a list of \texttt{commands that are not supported in TIPA} \%
\else
\PackageWarningNoLine{tipauni}{% You have used a command(s) that is (are) not in \texttt{tipsa}

\MessageBreak supported by package TIPA. Thus your current code is \texttt{incompatible} with that package. These commands are \texttt{printed} with a different Unicode font. Refer to the \texttt{documentation of package tipauni} for a list of \texttt{commands that are not supported in TIPA} \%
\fi}
From here the code for obtaining Unicode characters with TIPA commands starts.

\DeclareTextCommand{\tipaunistar}{TU}[1]{\textasteriskcentered}{#1}
\DeclareTextAccentDefault{\tipaunistar}{TU}
\DeclareTextCommand{\tipaunisemicolon}{TU}[1]{\textsc{dotlessj}}{#1}
\DeclareTextAccentDefault{\tipaunisemicolon}{TU}
\DeclareTextCommand{\tipaunicolon}{TU}[1]{\textsc{dotlessi}}{#1}
\DeclareTextAccentDefault{\tipaunicolon}{TU}
\DeclareTextCommand{\tipaunibang}{TU}[1]{\textsc{ng}}{#1}
\DeclareTextAccentDefault{\tipaunibang}{TU}
\DeclareTextCommand{\tipaunipipe}{TU}[2]{\textsc{ng}}{#1}{#2}
\DeclareTextAccentDefault{\tipaunipipe}{TU}

% Pulmonic consonants
%-- Stops
%--** Retroflex
\DeclareTextSymbol{\texttrtailt}{TU}{0288}
\DeclareTextComposite{\tipaunicolon}{TU}{t}{0288}
%--** Palatal
\DeclareTextSymbol{\texttrtaild}{TU}{0256}
\DeclareTextComposite{\tipaunicolon}{TU}{d}{0256}
%--** Uvular
\DeclareTextSymbol{\textscg}{TU}{0262}
\DeclareTextComposite{\tipaunisemicolon}{TU}{G}{0262}
%-- Nasals
%--** Labiodental
\DeclareTextSymbol{\textltailm}{TU}{0271}
\DeclareTextComposite{\tipaunistar}{TU}{m}{0271}
%--** Alveolar
\DeclareTextSymbol{\textltailn}{TU}{0272}
\DeclareTextComposite{\tipaunisemicolon}{TU}{n}{0272}
%-- Trills
%--** Bilabial
\DeclareTextSymbol{\textltails}{TU}{0274}
\DeclareTextComposite{\tipaunistar}{TU}{l}{0274}
%-- Uvular
\DeclareTextSymbol{\textltailr}{TU}{0279}
\DeclareTextComposite{\tipaunisemicolon}{TU}{r}{0279}
%--** Taps or flaps
%-- Labiodental flap
\tipaunicmd{\textltailm} % tipauni-exclusive
%--** Alveolar
\DeclareTextSymbol{\textltailr}{TU}{0280}
\DeclareTextComposite{\tipaunistar}{TU}{r}{0280}
%-- Labiodental flap
\tipaunicmd{\textltailm} % tipauni-exclusive
%--** Alveolar
Fricatives

** Bilabial

\begin{itemize}
\item \textphi
\item \textbeta
\end{itemize}

** Dental

\begin{itemize}
\item \texttheta
\item \textesh
\item \textyogh
\end{itemize}

** Postalveolar

\begin{itemize}
\item \textrtails
\item \textrtailz
\end{itemize}

** Palatal

\begin{itemize}
\item \textctj
\end{itemize}

** Velar

\begin{itemize}
\item \textgamma
\item \textchi
\item \textinvscr
\end{itemize}

** Uvular

\begin{itemize}
\item \textrtaill
\item \textturny
\item \textscl
\end{itemize}

** Retroflex

\begin{itemize}
\item \texthelperrz
\item \texthelperz
\end{itemize}

** Glottal

\begin{itemize}
\item \texthelperr
\end{itemize}

Lateral fricatives

** Alveolar

\begin{itemize}
\item \textrturnr
\item \texthelperrr
\end{itemize}

** Velar

\begin{itemize}
\item \texthelpermr
\end{itemize}

** Lateral approximants

\begin{itemize}
\item \texthelperral
\item \texthelperrc
\end{itemize}

Labiodental approximant
%% Non-pulmonic consonants
%%-- Clicks
%%--** Bilabial
\DeclareTextSymbol{\textbullseye}{TU}{“298}%%
\DeclareTextComposite{\tipaunibang}{TU}{o}{“298}
%%-- Postalveolar click
\tipaunim{\pstalvclick}{\textbullet} %% tipauni-exclusive
%%--** Palato-alveolar
\DeclareTextSymbol{\textdoublebarpipe}{TU}{“1C2}%%
\DeclareTextComposite{\tipaunibang}{TU}{c}{“1C2} %% tipauni-exclusive
%%--** Alveolar lateral
\DeclareTextSymbol{\textdoublepipe}{TU}{“1C1}%%
%%-- Implosives
%%--** Bilabial
\DeclareTextSymbol{\texthtb}{TU}{“253}%%
\DeclareTextComposite{\tipaunibang}{TU}{b}{“253}
%%--** Dental
\DeclareTextSymbol{\texthtd}{TU}{“257}%%
\DeclareTextComposite{\tipaunibang}{TU}{d}{“257}
%%--** Palatal
\DeclareTextSymbol{\textthbdotlessj}{TU}{“284}%%
\DeclareTextComposite{\tipaunibang}{TU}{j}{“284}
%%--** Velar
\DeclareTextSymbol{\texthtg}{TU}{“260}%%
\DeclareTextComposite{\tipaunibang}{TU}{g}{“260}
%%--** Uvular
\DeclareTextSymbol{\texthtscg}{TU}{“29B}%%
\DeclareTextComposite{\tipaunibang}{TU}{G}{“29B}
%% Other consonants
\DeclareTextSymbol{\textturnw}{TU}{“28D}%%
\DeclareTextSymbol{\textturnh}{TU}{“265}%%
\DeclareTextSymbol{\textsch}{TU}{“29C}%%
\DeclareTextSymbol{\textbarrevglotstop}{TU}{“2A2}%%
\DeclareTextComposite{\tipaunistar}{TU}{1}{“2A2} %% tipauni-exclusive
\DeclareTextSymbol{\textbarrevgstop}{TU}{“2A1}%%
\DeclareTextComposite{\tipaunistar}{TU}{2}{“2A1} %% tipauni-exclusive
\DeclareTextSymbol{\textctc}{TU}{“255}%%
\DeclareTextSymbol{\textctz}{TU}{“291}%%
\DeclareTextComposite{\tipaunistar}{TU}{Z}{“291} %% tipauni-exclusive
\DeclareTextSymbol{\texttheng}{TU}{“267}%%
\DeclareTextComposite{\tipaunistar}{TU}{3}{“267} %% tipauni-exclusive
\DeclareTextSymbol{\texttstar}{TU}{“29E}%%
\DeclareTextSymbol{\texttstar}{TU}{t}{“287}%%
\DeclareTextSymbol{\texttstar}{TU}{w}{“28D}%%
\DeclareTextSymbol{\texttstar}{TU}{E}{“1D07}%%
\DeclareTextComposite{\tipaunisemicolon}{TU}{J}{“1D0A}%%
\DeclareTextSymbol{\texttstar}{TU}{4}{“1D00}%%
\DeclareTextSymbol{\texttstar}{TU}{H}{“29C}%%
\DeclareTextSymbol{\texttstar}{TU}{U}{“1D1C}%%
%% Vowels
\DeclareTextSymbol{\textsci}{TU}{“26A}%%
\DeclareTextSymbol{\textscy}{TU}{“28F}%%
The following commands redefine the TIPA shorthand input for dependent diacritics.

No audible release

Syllabic

Non-syllabic

Laminal

Other complex shorthand commands
The replacement of several characters with different IPA symbols will be done in a small loop. That loop will loop over the contents of a sequence, and each sequence element will contain two token-list elements (braced groups), specifying a regular expression (really just one or two characters, nothing complicated) and the replacement text for that expression.

\ExplSyntaxOn
\seq_new:N \l__tipauni_replace_maps_seq
\seq_new:N \l__tipauni_remove_from_accents_seq
\tl_new:N \l__tipauni_textipa_tl

The sequence $\l__tipauni_replace_maps_seq$ stores the replacement mappings, we have to keep in mind that these are regular expressions in the first braced group, so characters that are not alpha-numeric should be escaped. Also, since we’re using $\seq_split:Nnn$ here (which doesn’t ignore empty elements) we have to make sure to not put too many commas in the list. First we set the mappings in a temporary sequence to pre-build the regular expressions to gain at least a bit of speed.

\seq_set_split:Nnn \l__tmpa_seq { , }

First we put the composites, which should have highest priority into the sequence (with some escaping of the characters which aren’t alpha-numeric):

\{ \c{\! | tipaunibang } G \},
\{ \c{\! | tipaunibang } g \},
\{ \c{\* | tipaunistar } 1 \},
\{ \c{\* | tipaunistar } 2 \},
\{ \c{\* | tipaunistar } 3 \},
\{ \c{\: | tipaunicolon } R \},
\{ \c{\: | tipaunicolon } A \},
\{ \c{\: | tipaunicolon } G \},
\{ \c{\: | tipaunicolon } B \},
\{ \c{\: | tipaunicolon } E \},
\{ \c{\: | tipaunicolon } H \},
\{ \c{\: | tipaunicolon } J \},
\{ \c{\: | tipaunicolon } L \},
\{ \c{\: | tipaunicolon } N \},
\{ \c{\: | tipaunicolon } R \},
\{ \c{\: | tipaunicolon } U \},

Next the multi-letter mappings:

\{ \c{\l\l} \}, \{ \c{\"\"} \},

And finally the remaining single-letter mappings:

\{ 5 \}, \{ A \}, \{ 6 \}, \{ 9 \}, \{ B \}, \{ C \}, \{ D \}, \{ 2 \}, \{ 3 \}, \{ 7 \}, \{ 8 \}, \{ 9 \}, \{ a \}, \{ e \}, \{ 11 \}
Now we build the real sequence from the temporary one. We have to call \regex-const:Nn for each item to precompile the regular expressions, then store the regular expressions name and the replacement in the correct sequence.

\seq_clear:N \l__tipauni_replace_maps_seq
\seq_map_inline:Nn \l_tmpa_seq{
\exp_args:Nco \regex_const:Nn{c__tipauni\exp_args:No \tl_to_str:n {\use_i:nn #1} _regex}{\use_i:nn #1}
\seq_put_right:Nx \l__tipauni_replace_maps_seq{\exp_not:c{c__tipauni\exp_args:No \tl_to_str:n {\use_i:nn #1} _regex}{\exp_not:o{\use_ii:nn #1}}}}

Since we have a non-standard syntax for some of the accent macros (having a starred variant) we have to exclude them from the list of accents which get special handling from \text_expand:n or else the stars will be surrounded by braces and not found by \@ifstar. This sequence stores the problematic accents which need to be excluded.

\seq_set_split:Nnn \l__tipauni_remove_from_accents_seq {,}{\~,\=,\",\r,\v,\t}
\cs_new_protected:Npn \__tipauni_nontipa_search:n #1{
\regex_match:nnT {\~} {#1} \nontipatrue
\regex_match:nnT {\=} {#1} \nontipatrue
\regex_match:nnT {\"} {#1} \nontipatrue
\regex_match:nnT {\r} {#1} \nontipatrue
\regex_match:nnT {\v} {#1} \nontipatrue
\regex_match:nnT {\t} {#1} \nontipatrue
} \cs_generate_variant:Nn \__tipauni_nontipa_search:n {o}
\NewDocumentCommand\textipa{+m}{\begingroup\let\*\tipaunistar\let\:\tipaunicolon\let\;\tipaunisemicolon\let\!\tipaunibang\let\|\tipaunipipe\catcode`\&=11\textipa{+m}}
\endgroup
Here we locally remove the accents which have a starred variant from the exclusion list of `\text\_expand:n`.

\seq\_map\_inline:Nn \l__tipauni\_remove\_from\_accents\_seq
{ \tl\_remove\_all:Nn \tl\_text\_accents\_tl \{##1\} }

Here is the real replacement. First we carefully expand the input using `\text\_expand:n`, then we’ll loop over the sequence. Since each sequence element contains two brace groups we can use the element \{#1\} directly as the two normal arguments to `\regex\_replace\_all:Nn`.

\tl\_set:Nx \l__tipauni\_textipa\_tl { \text\_expand:n {#1} }
\seq\_map\_inline:Nn \l\_tipauni\_replace\_maps\_seq
{ \regex\_replace\_all:Nn \tl\_textipa\_tl \{##1\} }
\l__tipauni\_textipa\_tl

Finally test for tipa-incompatible symbols. We only test for the incompatible symbols if the boolean is not yet true to save a bit of processing time when the tests are not necessary. Since the used `\regex\_match:nnT` test needs the token list expanded we expand it only once here with the o-variant.

\unless\ifnontipa
\l__tipauni\_nontipa\_search:o \l__tipauni\_textipa\_tl
\fi
\endgroup
\ExplSyntaxOff

The following commands define the long commands for dependent diacritics.

\Declarations
%-- Dependent diacritic marks
%--** Voiceless
\DeclareUnicodeAccent{\text\_subring}{TU}{"0325} %
\DeclareTextCommand{\r}{TU}{\tipaunisubring}
\protected\def\tipaunisubring\{\ifstar{\TipaUniSubRing}{\TipaUniSubRing}\}
\NewDocumentCommand\TipaUniSubRing{ m }{\text\_subring{\textipa{#1}}}
%--** Voiced
\DeclareUnicodeAccent{\text\_subwedge}{TU}{"032C} %
\DeclareTextCommand{\v}{TU}{\tipaunisubwedge}
\protected\def\tipaunisubwedge\{\ifstar{\TipaUniSubWedge}{\TipaUniSubWedge}\}
\NewDocumentCommand\TipaUniSubWedge{ m }{\text\_subwedge{\textipa{#1}}}
%--** More rounded
\DeclareUnicodeAccent{\text\_subrhalfring}{TU}{"0339} %
\NewDocumentCommand\tipaunisubrhalfring{ m }{\text\_subrhalfring{\textipa{#1}}}
%--** Less rounded
\DeclareUnicodeAccent{\text\_sublhalfring}{TU}{"031C} %
\NewDocumentCommand\tipaunisublhalfring{ m }{\text\_sublhalfring{\textipa{#1}}}
%--** Advanced
\DeclareUnicodeAccent{\text\_overcross}{TU}{"033D} %
\NewDocumentCommand\tipauniovercross{ m }{\text\_overcross{\textipa{#1}}}
%--** Breathy voiced
\DeclareUnicodeAccent{\text\_subbar}{TU}{"0320} %
\DeclareTextCommand{\=}{TU}{\tipaunisubbar}
\protected\def\tipaunisubbar\{\ifstar{\TipaUniSubBar}{\TipaUniSubBar}\}
\NewDocumentCommand\TipaUniSubBar{ m }{\text\_subbar{\textipa{#1}}}
%--** Mid-centralized
\DeclareUnicodeAccent{\text\_overcross}{TU}{"033D} %
\NewDocumentCommand\tipauniovercross{ m }{\text\_overcross{\textipa{#1}}}
%--** Retracted
\DeclareUnicodeAccent{\text\_subplus}{TU}{"031F} %
\DeclareTextCommand{\{text\_subplus\plus}{TU}{\text\_subplus\plus{##1}}
\protected\def\text\_subplus\plus{\ifstar{\text\_subplus\plus{\textipa{#1}}}{\text\_subplus\plus{\textipa{#1}}}}
%--** Mid-centralized
\DeclareUnicodeAccent{\text\_overcross}{TU}{"033D} %
\NewDocumentCommand\text\_overcross\plus{ m }{\text\_overcross\plus{\textipa{#1}}}
%--** Breathy voiced
Lastly the code for environment IPA is provided by the following.

\NewEnviron{IPA}{\textipa{\BODY}}
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